IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
LE VAN SUU

Serial No. **Not yet assigned**

Filing Date: **Herewith**

For: **UNIVERSAL MODULATOR/DEMODULATOR**

I HEREBY CERTIFY THIS PAPER OR FEE IS BEING DEPOSITED WITH THE U.S. POSTAL SERVICE "EXPRESS MAIL POST OFFICE TO ADDRESSEE" SERVICE UNDER 37 CFR 1.10 ON THE DATE INDICATED BELOW AND IS ADDRESSED TO: BOX PATENT APPLICATIONS, ASSISTANT COMMISSIONER FOR PATENTS, WASHINGTON, D.C. 20231.

EXPRESS MAIL NO: EL769467851US
DATE OF DEPOSIT: October 26, 2001
NAME: Greg French
SIGNATURE:

PRELIMINARY AMENDMENT

Director, U.S. Patent and Trademark Office
Washington, D.C. 20231

Sir:

Prior to the calculation of fees and examination of the present application, please enter the amendments and remarks set out below.

In the Drawings:

Submitted herewith is a request for a proposed drawing modification as indicated in red ink to label certain devices in FIGS. 1-5 in accordance with the specification. No new matter is being added.

In the Claims:

Please cancel Claims 1 to 16.

Please add new Claims 17 to 54.

17. A modulation/demodulation device capable of

operating according to a plurality of modulation types each using a different carrier frequency and comprising:

a microprocessor for providing transmit digital information;

a modulator for modulating, according to a given modulation type from among the plurality of modulation types, a transmit signal at a given carrier frequency based upon a signal of a predetermined duration representative of the transmit digital information;

a sending/receiving device coupled to said modulator; and

a demodulator coupled to said sending/receiving device and demodulating a received signal by

determining a given type of modulation and given carrier frequency for the received signal, and

analyzing the received signal based upon the given type of modulation to detect whether the received signal has the predetermined duration and supplying received digital information from the received signal to said microprocessor.

18. The modulation/demodulation device according to Claim 17 wherein said modulator comprises a generator for generating the transmit signal at the given carrier frequency, and wherein said generator comprises:

a memory for storing R digital codes each representative of a sinusoid;

at least one address counter for scanning successive addresses of the R digital codes at a frequency;

a digital-to-analog converter (DAC) coupled to said

memory for converting the R digital codes and supplying an analog signal at the carrier frequency; and

a bandpass filter coupled to said DAC for passing the analog signal at the carrier frequency.

19. The modulation/demodulation device according to Claim 18 wherein the frequency is equal to R times the carrier frequency.

20. The modulation/demodulation device according to Claim 18 wherein said at least one address counter comprises two address counters for scanning successive addresses at different frequencies; and wherein said generator further comprises a routing circuit for routing addresses of the two address counters as a function of the transmit digital information.

21. The modulation/demodulation device according to Claim 18 wherein said modulator comprises means for counting a number of cycles of said at least one address counter to determine the predetermined duration.

22. The modulation/demodulation device according to Claim 18 wherein said modulator further comprises means for determining the frequency of scanning of said at least one address counter based upon the carrier frequency and the number R.

23. The modulation/demodulation device according to Claim 17 wherein said demodulator comprises:

a plurality of bandpass filters each centered on a respective one of the carrier frequencies and filtering the received signal;

a respective gain controllable operational amplifier coupled to each of said bandpass filters and providing an output;

at least one comparator for comparing the output from each operational amplifier with a reference signal and providing a respective state signal for each output; and

an encoding circuit for encoding the state signals to determine a modulation type of the received signal.

24. The modulation/demodulation device according to Claim 23 further comprising a selection circuit for cooperating with said encoding circuit for selecting among the filtered received signals from said bandpass filters.

25. The modulation/demodulation device according to Claim 23 wherein each gain controllable operational amplifier comprises:

first, second and third comparators for comparing the filtered received signal input to said gain controllable operational amplifier to respective first, second, and third thresholds and supplying the state signals based upon the comparisons;

a logic circuit for combining the state signals from said comparators and selectively delivering pulses based thereon;

an up/down counter for receiving the pulses supplied by said logic circuit; and

a network of switchable resistors coupled to said up/down converter and providing feedback to said first, second, and third comparators.

26. The modulation/demodulation device according to Claim 25 wherein said up/down counter:

increments contents thereof when the filtered received signal input to said gain controllable operational amplifier is greater than the second threshold but less than the first and third thresholds;

decrements the contents thereof when the filtered received signal input to said gain controllable operational amplifier is greater than the first, second, and third thresholds; and

does not modify the contents thereof when the filtered received signal input to said gain controllable operational amplifier is greater than the first and second thresholds but is less than the third threshold.

27. The modulation/demodulation device according to Claim 25 wherein said up/down counter controls the network of switchable resistors to modify the feedback resistance.

28. The modulation/demodulation device according to Claim 23 wherein said plurality of bandpass filters comprise switched capacitor type filter means.

29. The modulation/demodulation device according to Claim 23 wherein said plurality of operational amplifiers comprise switched capacitor amplifier means.

30. The modulation/demodulation device according to Claim 17 wherein said demodulator comprises:

means for sampling each the received signal and encoding amplitudes of the samples into representative codes;

means for counting the samples and determining a period of the signal;

means for counting the number of periods of the received signal and determining whether the number of periods corresponds to a binary digit 1 or a binary digit 0; and

means for recording a succession of binary digit 1's and binary digit 0's.

31. The modulation/demodulation device according to Claim 30 wherein said means for sampling and encoding comprises:

a translation circuit for translating and shaping the received signal;

a sampling circuit for sampling the translated and shaped signal; and

an analog-to-digital converter for converting the samples to the representative codes.

32. The modulation/demodulation device according to Claim 30 wherein said means for counting the samples comprises:

a first comparator for comparing the representative codes of the samples with a code representative of a threshold and supplying a state signal when the amplitude of the sample is greater than the threshold;

a latch for storing the state signal supplied by said comparator;

a sample counting circuit for counting a number of the samples; and

a comparator for comparing the number of counted samples to an expected number of samples and supplying a validation signal when the number of counted samples and the expected number of samples are equal.

33. The modulation/demodulation device according to Claim 30 wherein said means for counting the number of periods comprises:

a counter for counting the number of periods of the received signal;

a first comparator for comparing the counted number of periods to a number N of periods for a binary digit 1 and supplying a first validation signal if the counted number of periods and the number N are equal; and

a second comparator for comparing the counted number of periods to a number M of periods for a binary digit 0 and supplying a second validation signal for the digit 0 if the counted number of periods and the number M are equal.

34. The modulation/demodulation device according to Claim 17 wherein said sending/receiving device sends the transmit signal to a remote site, and wherein said demodulator receives the received signal from the remote site via said sending/receiving device.

35. A modulation/demodulation device comprising:

a modulator for modulating, according to a given modulation type from among the plurality of modulation types each using a different carrier frequency, a transmit signal at a given carrier frequency based upon a signal of a predetermined duration representative of transmit digital information;

a sending/receiving device coupled to said modulator; and

a demodulator coupled to said sending/receiving device and demodulating a received signal by

determining a given type of modulation and given carrier frequency for the received signal, and

analyzing the received signal based upon the given type of modulation to detect whether the received signal has the predetermined duration and supplying received digital information from the received signal.

36. The modulation/demodulation device according to Claim 35 wherein said modulator comprises a generator for generating the transmit signal at the given carrier frequency, and wherein said generator comprises:

a memory for storing R digital codes each representative of a sinusoid;

at least one address counter for scanning successive addresses of the R digital codes at a frequency;

a digital-to-analog converter (DAC) coupled to said memory for converting the R digital codes and supplying an analog signal at the carrier frequency; and

a bandpass filter coupled to said DAC for passing

the analog signal at the carrier frequency.

37. The modulation/demodulation device according to Claim 36 wherein the frequency is equal to R times the carrier frequency.

38. The modulation/demodulation device according to Claim 36 wherein said at least one address counter comprises two address counters for scanning successive addresses at different frequencies; and wherein said generator further comprises a routing circuit for routing addresses of the two address counters as a function of the transmit digital information.

39. The modulation/demodulation device according to Claim 36 wherein said modulator comprises means for counting a number of cycles of said at least one address counter to determine the predetermined duration.

40. The modulation/demodulation device according to Claim 36 wherein said modulator further comprises means for determining the frequency of scanning of said at least one address counter based upon the carrier frequency and the number R.

41. The modulation/demodulation device according to Claim 35 wherein said demodulator comprises:

a plurality of bandpass filters each centered on a respective one of the carrier frequencies and filtering the received signal;

a respective gain controllable operational amplifier coupled to each of said bandpass filters and providing an output;

at least one comparator for comparing the output from each operational amplifier with a reference signal and providing a respective state signal for each output; and

an encoding circuit for encoding the state signals to determine a modulation type of the received signal.

42. The modulation/demodulation device according to Claim 41 further comprising a selection circuit for cooperating with said encoding circuit for selecting among the filtered received signals from said bandpass filters.

43. The modulation/demodulation device according to Claim 41 wherein each gain controllable operational amplifier comprises:

first, second and third comparators for comparing the filtered received signal input to said gain controllable operational amplifier to respective first, second, and third thresholds and supplying the state signals based upon the comparisons;

a logic circuit for combining the state signals from said comparators and selectively delivering pulses based thereon;

an up/down counter for receiving the pulses supplied by said logic circuit; and

a network of switchable resistors coupled to said up/down converter and providing feedback to said first, second, and third comparators.

44. The modulation/demodulation device according to Claim 43 wherein said up/down counter:

increments contents thereof when the filtered received signal input to said gain controllable operational amplifier is greater than the second threshold but less than the first and third thresholds;

decrements the contents thereof when the filtered received signal input to said gain controllable operational amplifier is greater than the first, second, and third thresholds; and

does not modify the contents thereof when the filtered received signal input to said gain controllable operational amplifier is greater than the first and second thresholds but is less than the third threshold.

45. The modulation/demodulation device according to Claim 43 wherein said up/down counter controls the network of switchable resistors to modify the feedback resistance.

46. The modulation/demodulation device according to Claim 35 wherein said demodulator comprises:

means for sampling each the received signal and encoding amplitudes of the samples into representative codes;

means for counting the samples and determining a period of the signal;

means for counting the number of periods of the received signal and determining whether the number of periods corresponds to a binary digit 1 or a binary digit 0; and

means for recording a succession of binary digit 1's and binary digit 0's.

47. The modulation/demodulation device according to Claim 46 wherein said means for sampling and encoding comprises:

a translation circuit for translating and shaping the received signal;

a sampling circuit for sampling the translated and shaped signal; and

an analog-to-digital converter for converting the samples to the representative codes.

48. The modulation/demodulation device according to Claim 46 wherein said means for counting the samples comprises:

a first comparator for comparing the representative codes of the samples with a code representative of a threshold and supplying a state signal when the amplitude of the sample is greater than the threshold;

a latch for storing the state signal supplied by said comparator;

a sample counting circuit for counting a number of the samples; and

a comparator for comparing the number of counted samples to an expected number of samples and supplying a validation signal when the number of counted samples and the expected number of samples are equal.

49. The modulation/demodulation device according to Claim 46 wherein said means for counting the number of periods comprises:

a counter for counting the number of periods of the

received signal;

a first comparator for comparing the counted number of periods to a number N of periods for a binary digit 1 and supplying a first validation signal if the counted number of periods and the number N are equal; and

a second comparator for comparing the counted number of periods to a number M of periods for a binary digit 0 and supplying a second validation signal for the digit 0 if the counted number of periods and the number M are equal.

50. The modulation/demodulation device according to Claim 35 wherein said sending/receiving device sends the transmit signal to a remote site, and wherein said demodulator receives the received signal from the remote site via said sending/receiving device.

51. A method for modulating and demodulating a signal comprising:

modulating, according to a given modulation type from among the plurality of modulation types each using a different carrier frequency, a transmit signal at a given carrier frequency based upon a signal of a predetermined duration representative of transmit digital information;

sending the transmit signal to a remote site and receiving a received signal from the remote site; and

demodulating the received signal by determining a given type of modulation and given carrier frequency for the received signal and analyzing the received signal based upon the given type of modulation to detect whether the received signal has the predetermined duration and supply received

digital information from the received signal.

52. The method according to Claim 51 further comprising generating the transmit signal at the given carrier frequency by:

storing R digital codes each representative of a sinusoid;

scanning successive addresses of the R digital codes at a frequency;

converting the R digital codes to an analog signal at the carrier frequency; and

filtering the analog signal using a bandpass filter centered at the carrier frequency.

53. The method according to Claim 52 wherein the frequency is equal to R times the carrier frequency.

54. The method according to Claim 51 wherein determining the given type of modulation and given carrier frequency for the received signal comprises:

filtering the received signal using a plurality of bandpass filters each centered on a respective one of the carrier frequencies;

amplifying the outputs of the bandpass filters;

comparing each of the amplified outputs with a reference signal and providing a respective state signal therefor; and

encoding the state signals to determine a modulation type of the received signal.

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REMARKS

It is believed that all of the claims are patentable over the prior art. For better readability and the Examiner's convenience, the newly submitted claims differ from the translated counterpart claims which are being canceled. The newly submitted claims do not represent changes or amendments that narrow the claim scope for any reason related to the statutory requirements for patentability.

Accordingly, after the Examiner completes a thorough examination and finds the claims patentable, a Notice of Allowance is respectfully requested in due course. Should the Examiner determine any minor informalities that need to be addressed, he is encouraged to contact the undersigned attorney at the telephone number below.

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Serial No. **Not yet assigned**
Filing Date: **Herewith**
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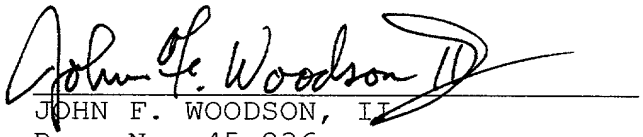
Respectfully submitted,



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EXPRESS MAIL NO: EL769467851US
DATE OF DEPOSIT: October 26, 2001
NAME: Greg French
SIGNATURE:

SUBMISSION OF PROPOSED MODIFICATIONS TO DRAWINGS

Director, U.S. Patent and Trademark Office
Washington, D.C. 20231

Sir:

Submitted herewith is a request for a proposed drawing modification as indicated in red ink to label certain devices in FIGS. 1-5 in accordance with the specification. No new matter is being added.

Respectfully submitted,

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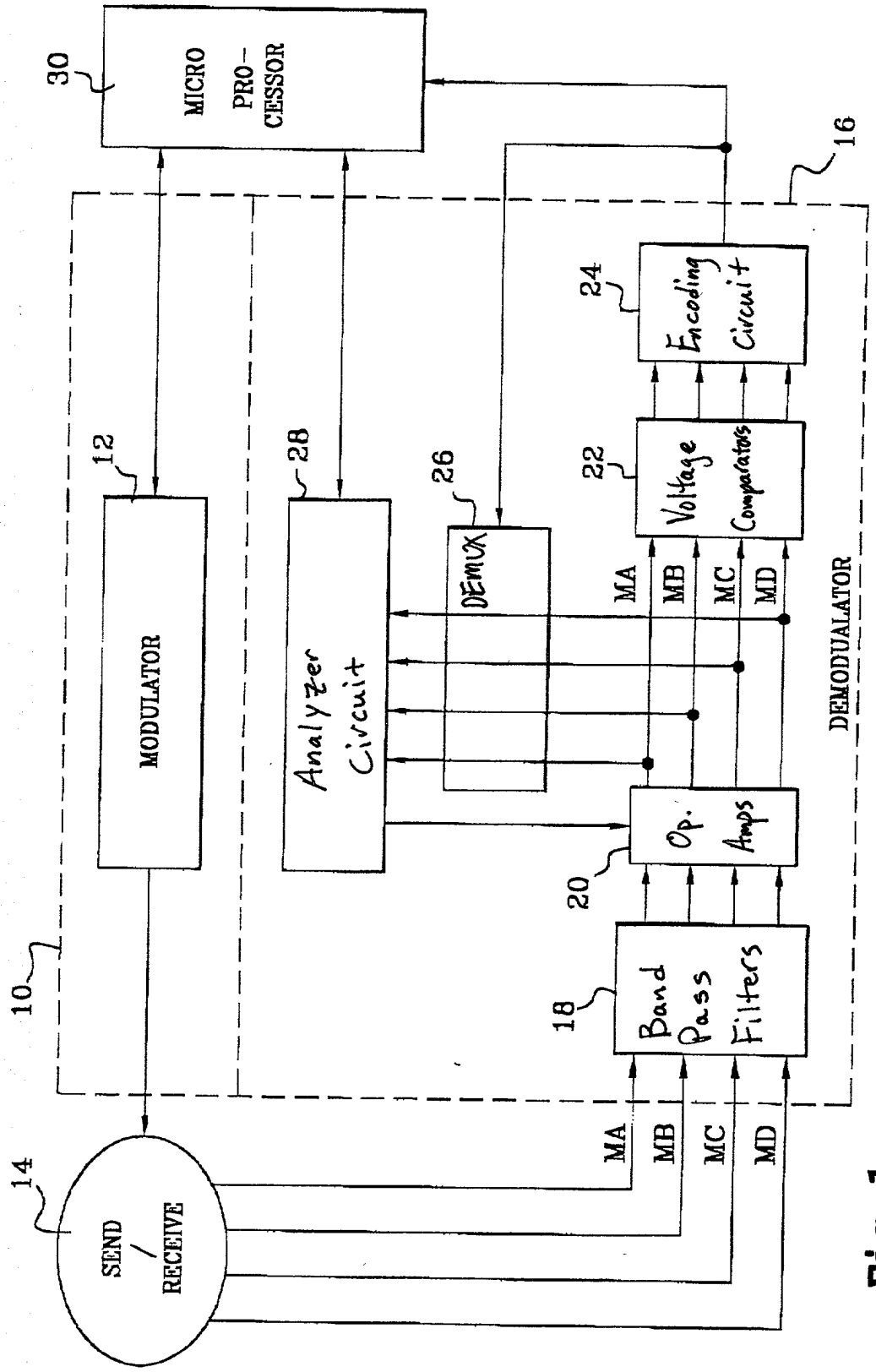
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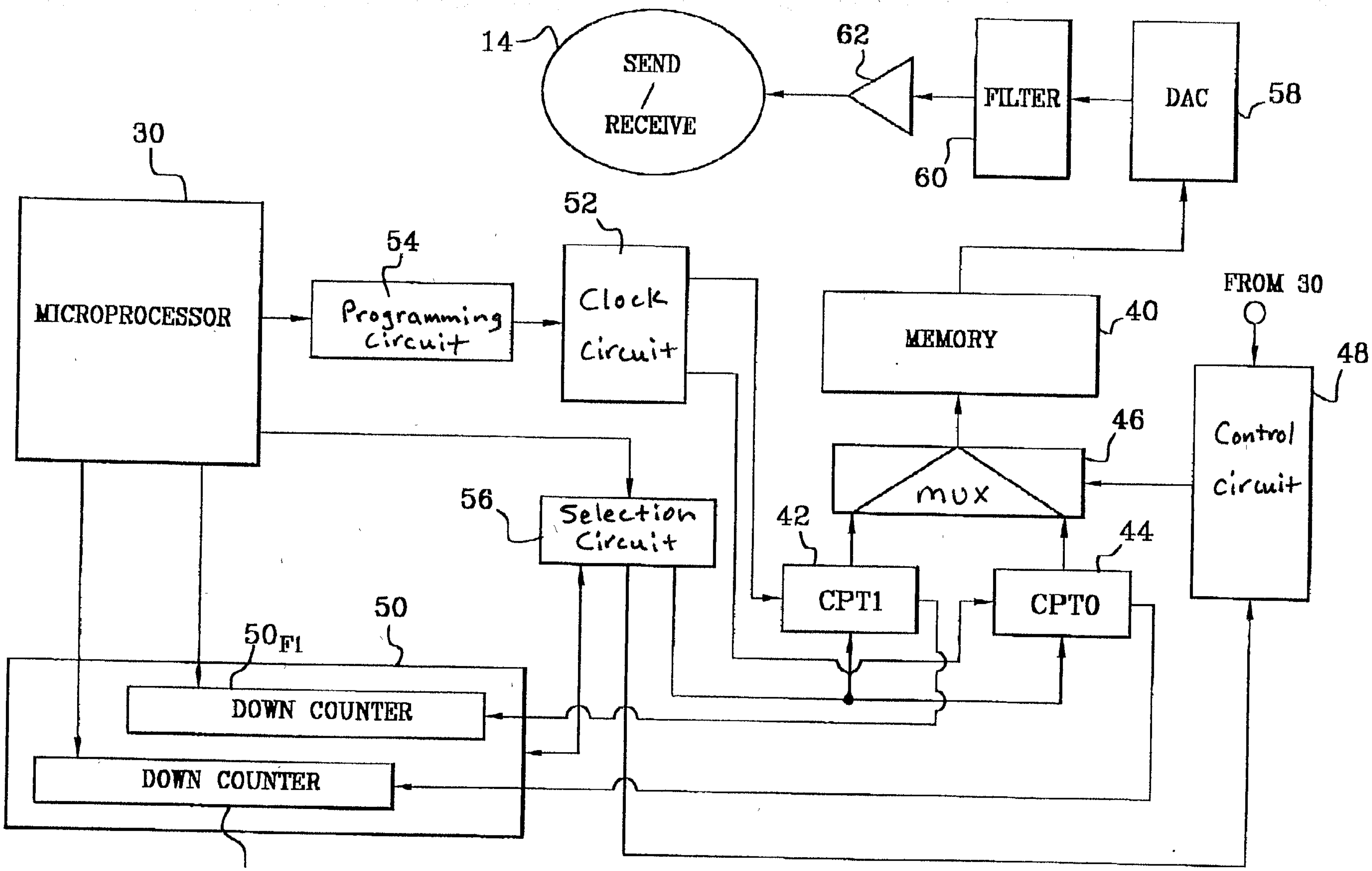
MICRO PRO-CESSOR
16
12
MODULATOR
28
Analyzer Circuit
26
DEMUX
24
Encoding Circuit
22
Voltage Comparators
MA
MB
MC
MD
DEMODULATOR
20
Op. Amps
18
Band Pass Filters
10
14
SEND / RECEIVE
MA
MB
MC
MD

Fig. 1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Clock circuit
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FROM 30
48
Control circuit
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MUX
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Selection Circuit
42
CPT1
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CPT0
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50_{F1}
DOWN COUNTER
DOWN COUNTER
50_{F0}

Fig. 2

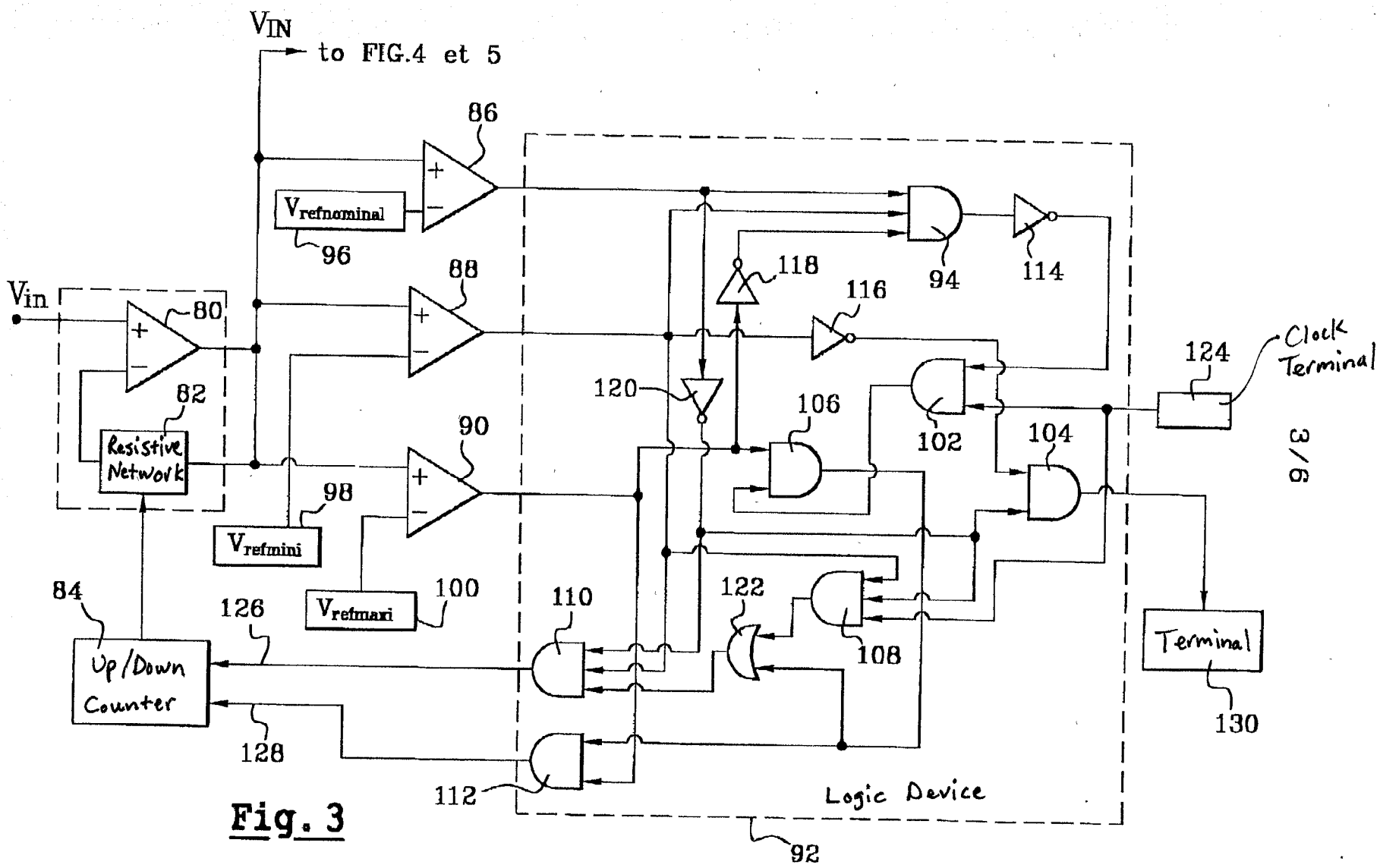
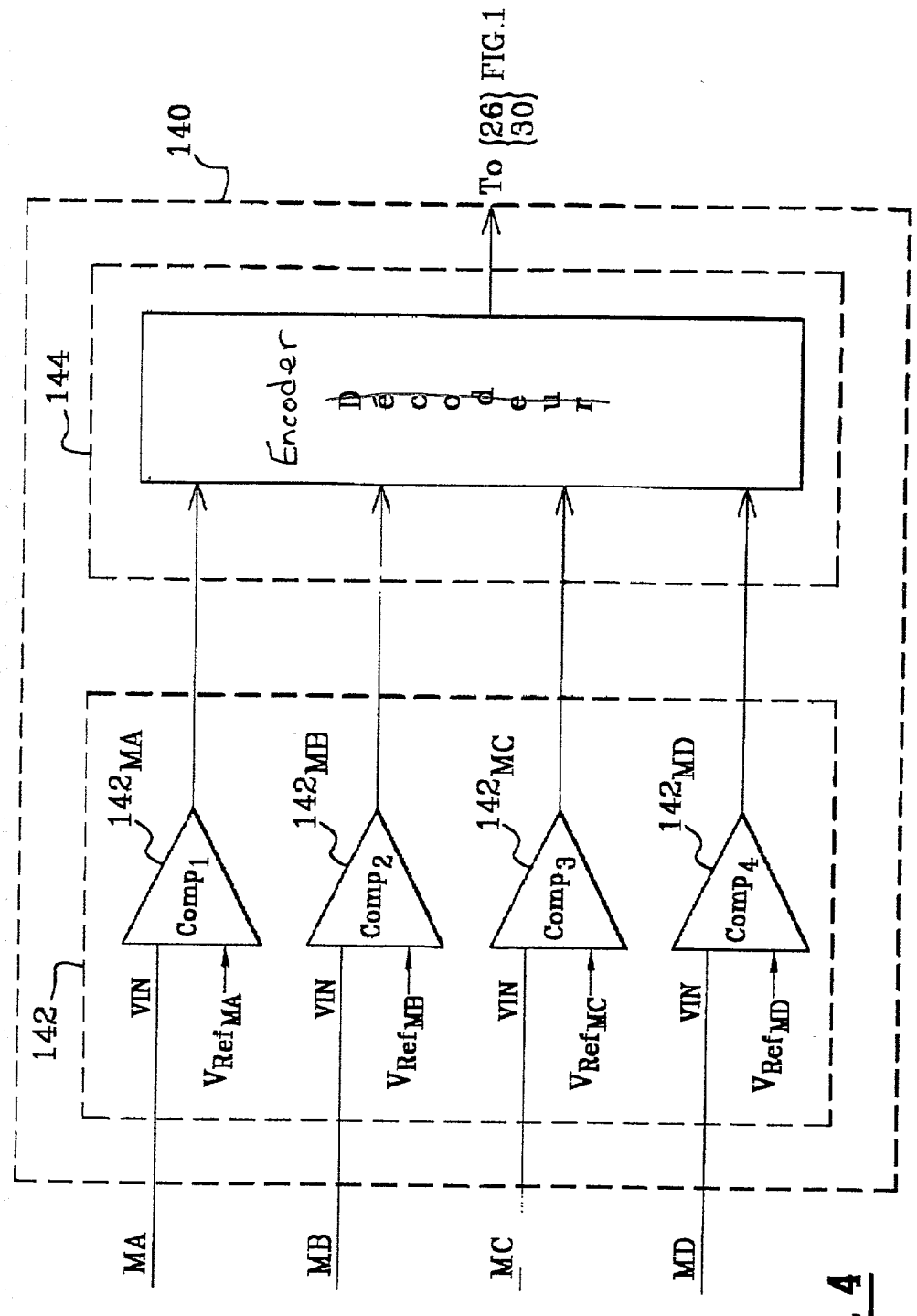


Fig. 3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To {26} {30} FIG.1
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Encoder
Decoder
142
142MA
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142MC
142MD
Comp1
Comp2
Comp3
Comp4
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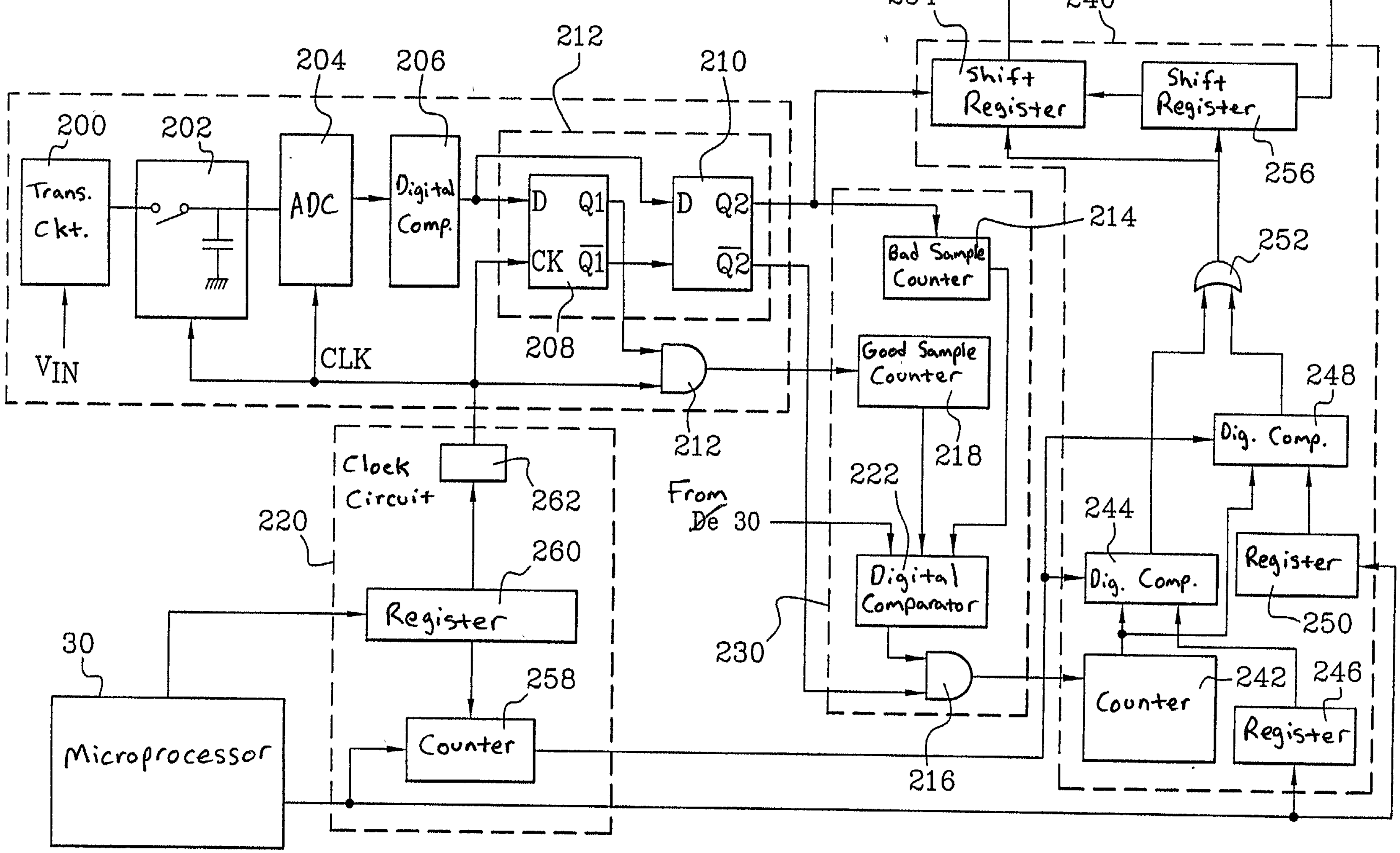
VRefMC
VRefMD
MA
MB
MC
MD

Fig. 4

Fig. 5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D Q2
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Register
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